

II. Rejection of Claims 1-10 Under 35 U.S.C. § 112, Second Paragraph

The Examiner has rejected claims 1-10 under 35 U.S.C. § 112, second paragraph on the assertion that the recitation of the term "chemical groups" in claim 1 is vague and indefinite. Claim 1 has been canceled without prejudice, and as a result, claims 3, 5, 6 and 8 are presently dependent upon claim 2. The term "chemical groups" is not present in claim 2, from which claims 3 to 10 ultimately depend. Accordingly, Applicants respectfully request withdrawal of the rejection to claims 1-10 under 35 U.S.C. § 112, second paragraph.

III. Rejection of Claims 1, 3, 6, and 8-10 Under 35 U.S.C. §103 over Befani in view of Sundberg

The Examiner has rejected claims 1-10 over a combination of references on the assertion that the cited combination of references renders the claim(s) obvious. In order for a combination of references to render a claim obvious, the combination of references must teach or suggest each of the elements of the claimed invention and must also provide the motivation to combine these elements to create the claimed invention. *In re Fine*, 5 U.S.P.Q.2d 1597 (Fed. Cir. 1988), *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1456 (Fed. Cir. 1998) and *In re Geiger*, 2 U.S.P.Q.2d 1276 (Fed. Cir. 1987). As discussed below, the cited combination of references does not suggest all of the elements of the claimed invention, nor does the cited combination of references provide a motivation to combine the elements to create the claimed invention.

The Examiner rejected claims 1, 3, 6, and 8-10 under 35 U.S.C. § 103(a) over Befani et al. (*Biotech. Appl. Biochem.* 28:99-104, 1998) in view of Sundberg et al. (USP 5,624,711) on the assertion that it would have been obvious to modify the method disclosed in Befani et al. by including the technique of immobilization of the biological or chemical molecules on a solid support resulting from the array taught by Sundberg et al. for the advantage of providing an improved method on a support.

The present invention is directed towards a method for making microarrays, which includes "...subjecting the surface of a solid support to an oxidation of olefinic groups present on said surface in order to allow the formation of aldehyde functions upon the surface of said solid support..." as required by step a) of claim 2. As stated above, the cited combination of references must teach or suggest each of the claimed limitations. There is no teaching or suggestion in the method of Befani et al. or the array of Sundberg et al. to oxidize olefinic groups on a solid support (array) to form an aldehyde as required by claim 2. Thus, the

rejection for obviousness over Befani et al. in view of Sundberg et al. fails to meet the requirements of M.P.E.P. 2143.

IV. Rejection of Claims 1, 3, 6, and 8-10 Under 35 U.S.C. §103 over Weetall et al. in view of Sundberg et al.

The Examiner has rejected claims 1, 3, 6, and 8-10 under 35 U.S.C. § 103(a) over Weetall et al. (*Applied Biochemistry and Technology*. 41:157-188, 1993) in view of Sundberg et al. (USP 5,624,711) on the assertion that it would have been obvious to modify the method of Weetall et al., to include oxidation of a solid support (glass surface) to form an aldehyde with the array as disclosed in Sundberg et al. to provide for an improved method of preparing libraries having large numbers of diverse biological polymers on a single support/chip for the determination of binding affinity and diagnostic application.

As stated above, the present invention is directed towards a method for making microarrays, to include "...subjecting the surface of a solid support to an oxidation of olefinic groups present on said surface in order to allow the formation of aldehyde functions upon the surface of said solid support..." as required by step a) of claim 2. The cited combination of references must teach or suggest each of the claimed limitations as required by M.P.E.P. 2143.03. There is no teaching or suggestion in the method of Weetall et al. or the array of Sundberg et al. to oxidize olefinic groups on a solid support (array) to form an aldehyde as required by claim 2. Weetall et al. disclose the use of glutaraldehyde (see pages 164 and 165 under "*Aldehyde Derivative*") which reacts on amino groups present on the support surface. For the foregoing reasons, Applicants submit the claimed invention is not obvious over Weetall et al. in view of Sundberg et al.

V. Rejection of Claims 1-10 Under 35 U.S.C. §103 over Barner et al. in view of Weetall et al. or Sundberg et al.

The Examiner has rejected claims 1-10 under 35 U.S.C. § 103(a) over Barner et al. (USP 5,986,066) in view of Weetall et al. or Sundberg et al. on the assertion that Barner et al. teaches a method of oxidizing an olefin on a solid surface with permanganate and periodate to form a functional group for immobilizing a protein and that combined with the disclosure of and aldehyde functional group from Weetall et al. or Sundberg et al. renders the claimed invention obvious.

The present invention requires oxidizing olefinic groups present on the surface of a solid support to form an aldehyde on the surface of the support as recited in claim 2. The Examiner points to Barner et al., who disclose oxidizing octenyl trichlorosilane with permanganate and periodate to form carboxylic groups (see col. 8, lines 36-58). Because carboxylic groups cannot react with biological molecules such as proteins, they are then activated to an N-hydroxysuccinimide ester in the presence of pyridine. Thus, there is no suggestion in Barner that an olefin should be oxidized into an aldehyde as recited in the claimed methods. Furthermore, the activation of carboxylic groups in the presence of pyridine to produce N-hydroxysuccinimide esters is difficult to perform on a group fixed to a surface.

As stated above, the present invention is not taught or suggested by Weetall et al. in view of Sundberg et al. The addition of the Barner et al. reference does not supplement the foregoing deficiencies in the Weetall et al. and/or Sundberg et al. reference(s) to teach or suggest the claimed invention.

In view of the foregoing, Applicants respectfully request withdrawal of the rejection to the claims under 35 U.S.C. § 103(a).

VI. Advantages of the Methods of the Present Invention

In addition to the points raised above, as attested in the accompanying Declaration Under 37 C.F.R. §1.132, the present invention provides a number of advantages with respect to the sensitivity, stability, reproducibility, and effectiveness of the microarrays produced therefrom. These advantages are not taught or suggested by the cited references.

VII. Formal Drawings

The Office Action of May 8, 2002 included a Notice of Draftsperson's Patent Drawing Review, objecting to Figures 1-3 filed April 10, 2001. Applicants submit herewith formal drawings of Figures 1-3 which address and overcome the Draftsperson's objections.

VIII. Conclusion

Claim 1 has been canceled without prejudice and claims 2, 3, 5, 6 and 8 have been amended. In addition, Applicants have submitted herewith formal drawings for Figures 1-3. The changes made to the claims by the current amendment, including insertions and **[deletions]**, are shown on an attached sheet entitled **VERSION WITH MARKINGS TO SHOW**

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Filed : April 10, 2001

CHANGES MADE, which follows the signature page of this amendment. No new matter has been added herewith.

In view of the foregoing, Applicants respectfully submit the present application is fully in condition for allowance. If any issues remain that may be addressed by a phone conversation, the Examiner is invited to contact the undersigned at the phone number listed below.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

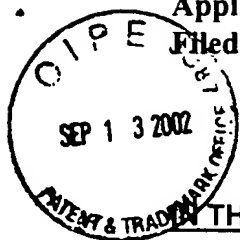
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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

2. (Amended) A[The] method [according to claim 1, wherein the chemical group being subjected to]for making microarrays comprising the steps:

a) _____ subjecting the surface of a solid support to an oxidation [is an]of olefinic groups present on said surface in order to allow the formation of aldehyde functions upon the surface of said solid support; and

b) _____ covalently binding upon said aldehyde functions capture molecules designed for the detection, the identification, the quantification and/or the recovery of complementary target biological or chemical molecules of interest; said covalent binding resulting in an array comprising a density of at least 4 or more discrete regions/cm² of solid support surface, each of said discrete surface regions being bound with a species of capture molecules.

3. (Amended) The method according to claim [1]2, wherein said oxidation is performed in an aqueous solution.

5. (Amended) The method according to claim [1]2, wherein the solid support surface has been previously modified by the addition of olefinic groups upon said surface.

6. (Amended) The method according to claim [1]2, wherein the solid support surface is made of a glass layer.

8. (Amended) The method according to claim [1]2, wherein the capture molecules are biological capture molecules.

Claim 1 has been canceled without prejudice.